URS

May 24, 2012 *Submitted Via Federal Express*

Mr. W. Owen Thompson
Remedial Project Manager
Superfund Remedial Response Section Seven
U.S. EPA Region 5, SR-6J
77 W. Jackson Blvd.
Chicago, IL 60604

Subject: Results of Additional Soil Borings Investigation
Detrex Source Control Area – Fields Brook Superfund Site
Detrex Corporation, Ashtabula, Ohio
Docket No. V-W-98-C-450

Dear Mr. Thompson:

On behalf of Detrex Corporation, URS Corporation (URS) is submitting the results obtained from the Additional Soil Boring Investigation that was recently completed at the Detrex Facility. This work was completed in order to collect additional data to better understand the occurrence of DNAPL in the subsurface at the Detrex Facility. On April 6, 2012, Detrex, USEPA, and URS had a teleconference call to discuss the results of the MIP Investigation completed in early March 2012. During the April 6, 2012 meeting, Ohio EPA and USEPA requested additional soil borings in the former lagoon to evaluate subsurface occurrence of DNAPL in both natural soils and fill located in the former lagoon area. At that time, Detrex suggested that USEPA, Ohio EPA and its subcontractors be available for a technical meeting and be present during additional DNAPL delineation investigations. This meeting was scheduled for May 1 and 2, 2012.

On April 30, 2012, URS submitted a letter report describing the results of the MIP / Soil Boring Investigation completed in March 2012. During the meeting on May 1, 2012, all parties reviewed information presented during the April teleconference call regarding the updated Site Conceptual Model and DNAPL occurrence. In addition, the group collaboratively selected additional soil boring locations that would be drilled to assess DNAPL occurrence and evaluate geologic materials in reference to location of former lagoons, placement of potential DNAPL recovery wells and the ability to extract groundwater and DNAPL.

1.0 Soil Boring Investigation Results

During the two day sampling program, fourteen (14) soil borings were completed within various areas at the Detrex Facility, which included the following: previous MIP locations not sampled in March 2012; areas outside of plant operations, and areas within the northeastern portion of the facility where the former lagoons where located. **Figure 1** provides an updated

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drawing to shown locations of all MIP and soil boring locations. This figure also shows the approximate boundaries of the former lagoons in the northeast portion of the facility. The approximate locations of the former lagoon boundaries were based on a historical air photograph from the area circa 1955-1960. A copy of this photograph is provided in **Appendix A**. **Figure 1** also shows the locations of geologic cross sections A-A' and B-B', which are attached as **Figures 2** and **3**, respectively.

During the May 1-2, 2012 investigation, soil borings were completed in areas of the facility that were either underlain by natural soils (i.e. undisturbed areas) or in areas underlain by backfill soils placed in the former lagoon area. Based on detailed geologic descriptions from the continuously sampled geoprobe locations, four (4) sampling locations were located in undisturbed areas (GP MW-10, GP 21, 28, and 36) and ten (10) were located in backfilled lagoon areas (GP 10, 48, 49, 6, 7, 11, 16, 20, 25, and 7). The individual boring logs are provided in **Appendix B**.

1.1 Site Conceptual Model

In the April 30, 2012 MIP/Soil Boring Investigation letter report submitted to USEPA, a revised Site Conceptual Model (SCM) was developed. The soil boring data collected during May 1-2, 2012 additional sampling program has subsequently been used to update the existing geologic cross sections. **Figures 2** and **3** provide geologic cross sections that illustrate the site and the approximate boundaries of the former lagoon area that has been backfilled with clay soils.

The results obtained from these additional 14 soil borings confirm the SCM features previously described in the April 30, 2012 investigation letter report. In particular, the following aspects of DNAPL occurrences are noted from the evaluation of the additional investigation work:

- Former lagoon area is backfilled with compacted clay soils to depths ranging from 5ft (GP-11) to 17 ft (GP-17) below grade.
- Sheen is occasionally observed in clay soil, backfilled areas, and natural soils in thin wet sandy silty lenses and in clay soils (GP-6, GP-10, GP-16, GP-49, and GP-25).
- DNAPL ganglia are occasionally observed in thin wet sandy lenses (2-3 ft thick) and in naturally occurring silty clay soils beneath the backfilled lagoon area (GP-48, GP-49, GP-10 and GP-16).
- No pooled DNAPL was observed in any of the additional soil borings.

2.0 Conclusions

As a result of conducting additional soil borings at the Detrex facility, the following conclusions have been developed regarding the distribution and occurrence of impacted soil, impacted groundwater, and DNAPL impacts:

- Soil borings completed in May 2012, once again confirm previous reported subsurface conditions (i.e. low permeability clay soils overlying lower permeability glacial till deposits, and the presence of perched groundwater encountered at approximately 10-15 ft bgs with low yield).
- When DNAPL is observed, it is found in discontinuous cracks/voids in backfill clay soils; sheen in thin wet silty/sandy lenses; and as ganglia in discontinuous wet silt/sand lenses typically less than 2-3 ft thick.
- There is no evidence of thick/extensive zones or layers DNAPL anywhere on site.
- DNAPL is observed in wet sandy lenses beneath (20-25 ft bgs) the former lagoon area in the vicinity of the existing DNAPL recovery well array and in the depth interval of the existing well screens (i.e. 20-30 ft bgs).
- The fine grained, low permeability silty clay soil and discontinuous thin sand lenses on site are not conducive for extracting significant quantities of either groundwater or DNAPL impacted fluids. The presence of these fine grained silty clay soil and low water yielding explain the difficulties that the existing vacuum extraction system has had in operations.
- The subsurface conditions observed in all soil borings indicate that the subsurface materials are not typical of aquifers, but rather aquitards. As a result, groundwater and DNAPL will not readily migrate from the source area and have limited vertical and lateral mobility.
- The occurrence of DNAPL and DNAPL ganglia in thin lenses, at multiple depths in clay backfill and natural silty clay soils presents difficulty for removal using vertical well screens in boreholes.

3.0 Path Forward and Recommendations

Based on the findings of this investigation and the MIP investigation submitted on April 30, 2012, the following recommendations are provided for consideration.

- The DNAPL recovery well design proposed by FBAG is not appropriate for the geologic conditions and the DNAPL occurrence patterns at the Detrex site.

- Since there are no thick extensive zones or layers of DNAPL anywhere and the site soils are dominated by clays and silts, the use of vertical recovery wells to recover DNAPL from discontinuous zones seems impractical as supported by difficulties in the operation of the existing recovery system.
- The data collected during the past several years indicates that the occurrence of DNAPL has been adequately defined and that alternative methods other than verified recovery wells should be considered in order to optimize the recovery of any potentially mobile DNAPL for long term DNAPL recovery.

As a result of these findings, Detrex is requesting a meeting with USEPA to further review the data that has been collected and consider the steps necessary to further assess an Explanation of Significant Difference (ESD) or ROD Amendment for the current Source Control remedy that is currently in place.

We look forward to hearing from you soon to arrange the meeting. If you have any questions regarding the information provided in this letter report, please do not hesitate to contact me at 216-622-2432 or Tom Steib at 440-997-6131 at your convenience.

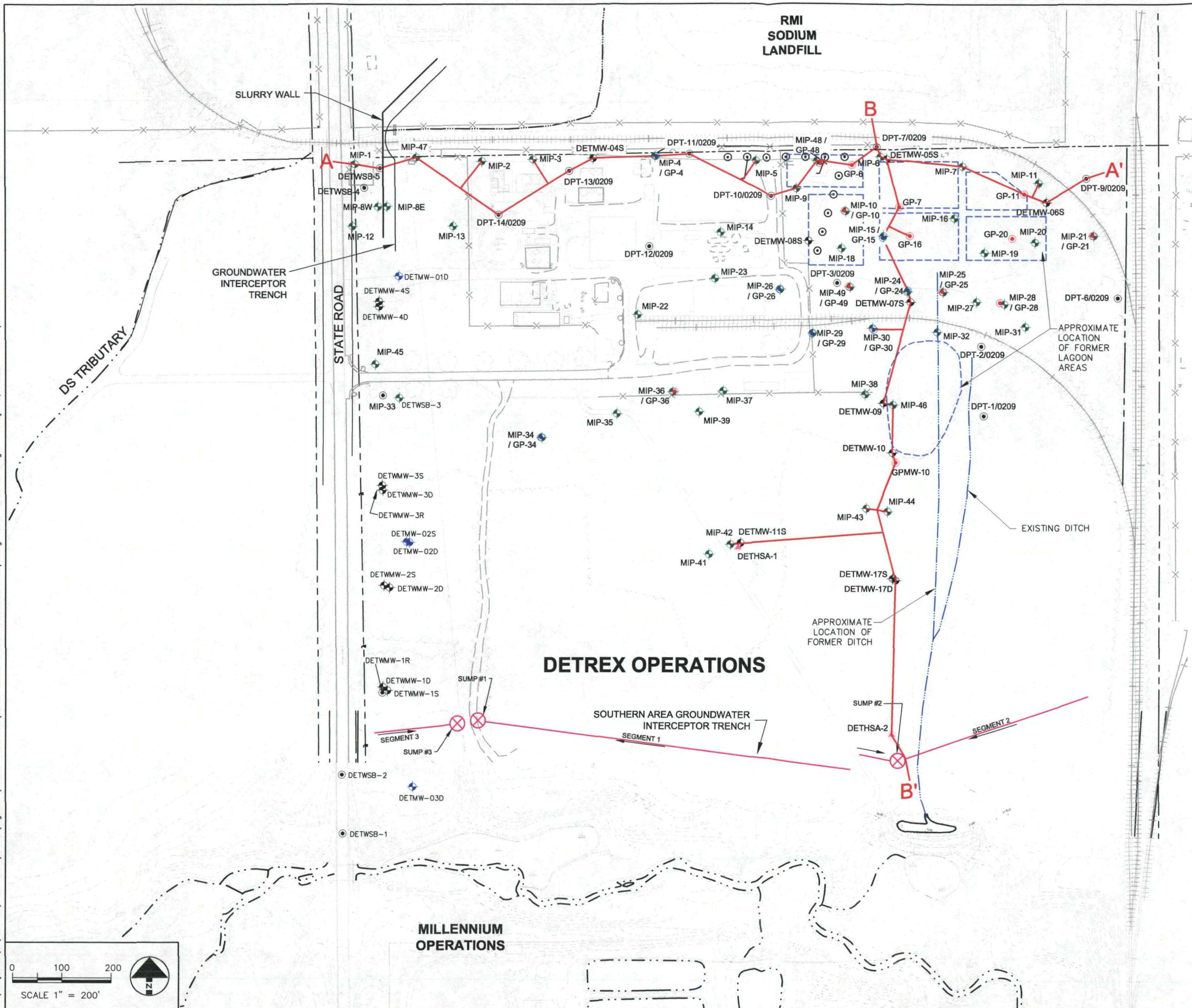
Sincerely,

URS Corporation - Ohio

Martin L. Schmidt, Ph.D.
Vice President

cc: R. Currie – Detrex Corporation
T. Doll - Detrex Corporation
✓ P. Felitti, U.S. EPA
T. Steib – Detrex Corporation
R. Williams – Ohio EPA
W. Earle – SulTRAC

FIGURES



LEGEND

- APPROXIMATE LOCATION OF FORMER LAGOON AREAS
- MIP LOCATIONS
- CONFIRMATORY GP AND MIP BORING LOCATIONS
- CONFIRMATORY GP LOCATIONS ADVANCED IN MAY 2012 WITH USEPA
- MONITORING WELLS
- DNAPL DELINEATION SOIL BORINGS
- HOLLOW STEM AUGER SOIL BORINGS
- RECOVERY WELLS
- EXISTING GROUND SURFACE CONTOUR (ft. MSL)
- A——A' CROSS SECTION LOCATION
- SLURRY WALL
- NORTHERN GROUNDWATER INTERCEPTOR TRENCH
- SOUTHERN AREA GROUNDWATER INTERCEPTOR TRENCH
- ⊗ INTERCEPTOR TRENCH SUMP

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MIP AND SOIL BORING LOCATION MAP

DRAWN BY:	CHECKED BY:	PROJECT No:	DATE:	FIGURE No:
AMH	MLS	13814865	4/27/12	1

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WEST
A

EAST
A'

SLURRY WALL

GROUNDWATER INTERCEPTOR TRENCH

APPROXIMATE LIMITS OF FORMER LAGOON AREAS

DETWSB-5

MIP- 01
PID (uV x 10^6)
0.0 2.05 4.09

MIP- 47
PID (uV x 10^6)
0.0 1.39 2.78

DPT-14/0209

MIP- 02*
PID (uV x 10^6)
0.0 3.08 6.15

DPT-13/0209

MIP- 03*
PID (uV x 10^6)
0.0 8.85 17.70

DETMW-04S

MIP- 04
PID (uV x 10^6)
0.0 20.21 40.42

DPT-11/0209

MIP- 05*
PID (uV x 10^6)
0.0 16.18 32.36

DPT-10/0209

MIP- 09
PID (uV x 10^6)
0.0 17.22 34.43

MIP- 48
PID (uV x 10^6)
0.0 7.94 15.87

GP-48

GP-6

DPT-7/0209

MIP- 06
PID (uV x 10^6)
0.0 5.82 11.23

DETMW-05S

MIP- 07
PID (uV x 10^6)
0.0 5.42 10.83

GP-11

MIP- 11*
PID (uV x 10^6)
0.0 21.12 42.25

DETMW-06S

DPT-9/0209

GRAVEL

LACUSTRINE ORANGE BROWN AND GRAY SILTY CLAY

LACUSTRINE GRAY SILTY CLAY

LACUSTRINE SAND / SILT

SILT / SAND

SILT

SANDY GRAVEL

FILL

SAND

SANDY CLAY

TILL

ELEVATION FT (MSL)

640
630
620
610
600
590

0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800

DISTANCE (FT)

LEGEND

- LACUSTRINE ORANGE BROWN AND GRAY SILTY CLAY
- LACUSTRINE GRAY SILTY CLAY
- FILL
- LACUSTRINE SAND / SILT
- GLACIAL TILL
- STATIC WATER LEVEL
- WATER LEVEL ENCOUNTERED AT TIME OF DRILLING
- DETWSB-05 BORING DESIGNATION
- APPROXIMATE GEOCONTACT

NOTE:
STRATIGRAPHIC CONDITIONS INTERPOLATED BETWEEN DATA POINTS. ACTUAL CONDITIONS MAY VARY

*MIP-2, MIP-3, MIP-5 AND MIP-11 PROJECTED ONTO CROSS SECTION FROM NEARBY LOCATIONS. MIP-6 LOCATED BETWEEN DPT-7/0209 AND DETMW-05S

0 5 10
VERTICAL SCALE 1" = 10'
HORIZONTAL EXAGGERATION = 12.5X

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GEOLOGIC CROSS SECTION A-A'

DRAWN BY:	CHECKED BY:	PROJECT No:	DATE:	FIGURE No:
AMH	MLS	13814613	5/18/12	2

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NORTH
B

SOUTH
B'

APPROXIMATE LIMITS OF FORMER LAGOON AREA

DETMW-05S
GP-7
GP-16*
GP-15
DETMW-07S
GP-24
GP-30
DETMW-09S
DETMW-10S
MIP- 43*
PID (uV x 10^6)
0.0 0.10 0.20
DETMW-11S*
(Kh=2.49E-05)
DETMW-17D
GROUNDWATER INTERCEPTOR TRENCH (CORRUGATED PIPE WITH SAND BACKFILL)

DPT-7/0209
MIP-6*
PID (uV x 10^6)
0.0 5.62 11.23
MIP-15
PID (uV x 10^6)
0.0 6.90 13.80
MIP- 24
PID (uV x 10^6)
0.0 11.05 22.10
MIP- 30
PID (uV x 10^6)
0.0 24.60 49.21
MIP- 46
PID (uV x 10^6)
0.0 14.59 29.18
GPMW-10
MIP- 44*
PID (uV x 10^6)
0.0 0.07 0.15
DETHSA-1*
MIP- 42*
PID (uV x 10^6)
0.0 0.09 0.18
DETHSA-2
IT-601
(Kh=1.03E-07)

FILL
SAND / SILT
LACUSTRINE BROWN AND GRAY SILTY CLAY
LACUSTRINE GRAY SILTY CLAY
TILL
SHALE

(10'-12')
Kv=3.468E-08
(15'-17')
Kv=3.117E-08
(28'-30')
Kv=1.686E-08

ELEVATION (FT-MSL)
640
630
620
610
600
590

0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500

DISTANCE (FT)

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LEGEND

- LACUSTRINE ORANGE BROWN AND GRAY SILTY CLAY
- LACUSTRINE GRAY SILTY CLAY
- SHALE
- STATIC WATER LEVEL
- LACUSTRINE SAND / SILT
- GLACIAL TILL
- FILL
- WATER LEVEL ENCOUNTERED AT TIME OF DRILLING
- DETMW-07S — BORING DESIGNATION
- APPROXIMATE GEOCONTACT
- THIN-WALLED TUBE GEOTECHNICAL SOIL SAMPLE

0 10
VERTICAL SCALE 1" = 10'
HORIZONTAL EXAGGERATION = 10X

NOTE:
CROSS SECTION (D-D') FROM FEBRUARY MEETING WITH USEPA, DETREX, AND S.S. PAPADOPULOS AND ASSOC. UPDATED WITH MIP INVESTIGATION RESULTS

*DETMW-11S, MIP-42, GP-16, AND DETHSA-1 PROJECTED ONTO CROSS SECTION FROM NEARBY LOCATIONS. MIP-6 LOCATED BETWEEN DPT-7/0209 AND DETMW-05S

Kv - SOIL PERMEABILITY RESULTS IN CM/SECOND

Kh - HYDRAULIC CONDUCTIVITY RESULTS IN CM/SECOND

STRATIGRAPHIC CONDITIONS INTERPOLATED BETWEEN DATA POINTS. ACTUAL CONDITIONS MAY VARY

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CROSS SECTION B-B'

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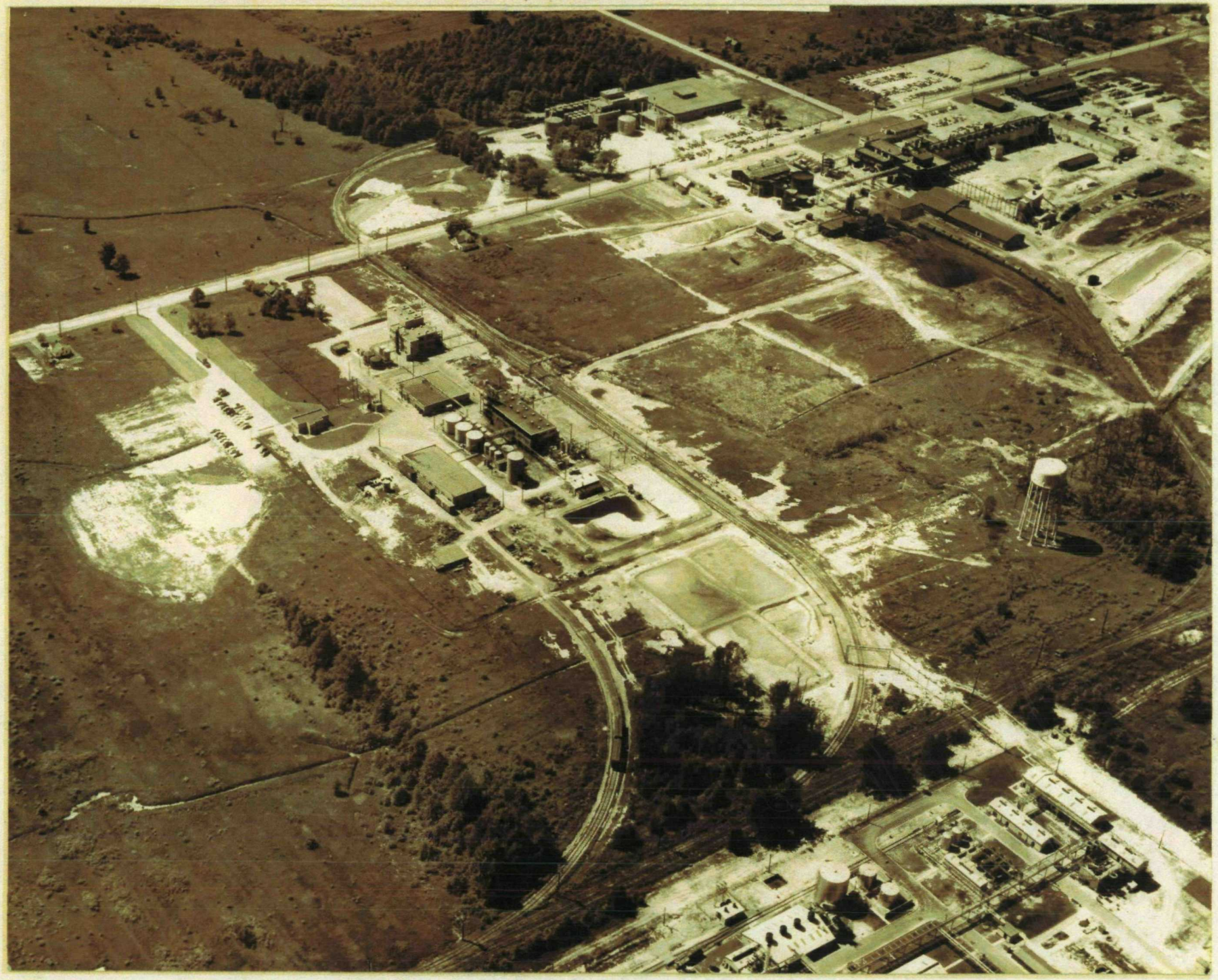
AMH	MLS	13814613	5/18/12	3

APPENDICES

APPENDIX A
HISTORICAL AIR PHOTOGRAPH



APPENDIX B
INDIVIDUAL BORINGS

BORING LOGS
(IN LAGOON AREA)

Project: Detrex MIP Confirmatory Borings
Project Location: 1100 State Road, Ashtabula, OH
Project Number: 13814865

Key to Log of Boring

Sheet 1 of 1

Elevation, feet	Depth, feet	SAMPLES: Type	SAMPLES: Number	Recovery, inches	Headspace, ppm	Graphic Log	MATERIAL DESCRIPTION	FIELD NOTES
1	2	3	4	5	6	7	8	9

COLUMN DESCRIPTIONS

1 **Elevation:** Elevation in feet referenced to mean sea level.

2 **Depth:** Depth in feet below the ground surface.

3 **Sample Type:** Type of soil sample collected at depth interval shown; sampler symbols are explained below.

4 **Sample Number:** Sample identification number.

5 **Recovery:** Length (in inches) of soil sample actually recovered in the sampler.

6 **Headspace, ppm** MiniRae 11.7eV Photo-Ionization Detector (PID) reading in headspace of sealable plastic bag after several minutes of vapor accumulation.

7 **Graphic Log:** Graphic depiction of subsurface material encountered; typical symbols are explained below.

8 **Material Description:** Description of material encountered; may include moisture, color, grain size, and density/consistency.

9 **Remarks:** Comments and observations regarding drilling or sampling made by driller or field personnel.

ATD At Time of Drilling
NR Not Recorded
NA Not Applicable
bgs Below Ground Surface

TYPICAL MATERIAL GRAPHIC SYMBOLS

FILL
SAND
Silty SAND
SILT
Clayey SILT
Silty CLAY
CLAY

TYPICAL SAMPLER GRAPHIC SYMBOLS

Geoprobe Dual Tube Sampler

OTHER GRAPHIC SYMBOLS

First water encountered at time of drilling and sampling (ATD)

Static water level measured using electronic water level indicator

Minor change in material properties within a lithologic stratum

GENERAL NOTES

1. Soil classifications are based on the Unified Soil Classification System. Descriptions and stratum lines are interpretive; actual lithologic changes may be gradual. Field descriptions may have been modified to reflect results of lab tests.
2. Descriptions on these logs apply only at the specific boring locations and at the time the borings were advanced. They are not warranted to be representative of subsurface conditions at other locations or times.

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Report: GEOPROBE_SOIL_BORING_KEY; File: C:\USERS\ANTON_HEITGER\DESKTOP\DETREX MAY 2012 GPS.GPJ; 5/21/2012

Project: Detrex MIP Confirmatory Borings
Project Location: 1100 State Road, Ashtabula, OH
Project Number: 13814865

Log of Boring GP-6

Sheet 1 of 1

Date(s) Drilled	5/2/12	Logged By	W. Clayton	Checked By	M. Schmidt
Drilling Method	Direct Push	Drill Bit Size/Type	Dual Tube Geoprobe Sampler	Total Depth of Borehole	27.0 feet
Drill Rig Type	Geoprobe 6620 DT	Drilling Contractor	Frontz Drilling	Surface Elevation	635.9
Groundwater Level at Time of Drilling	Approximately 19.0' bgs ATD	Sampler Types	4' Dual Tube Sampler	Boring Completion	Bentonite Chips
Boring Location					

Elevation, feet	Depth, feet	SAMPLES Type	Number	Recovery, inches	Headspace, ppm	Graphic Log	MATERIAL DESCRIPTION	FIELD NOTES
635	0		DP-1	21	N/A		Stiff, moist, brown, tan and gray mottled, CLAY [FILL]	
	5		DP-2	19	N/A		black and white granular material [FILL] becomes brown with some silt	
630								
	10		DP-3	30	N/A		sheen	
625			DP-4	48	N/A		Stiff, moist, gray, CLAY, with silt varving throughout [LACUSTRINE]	
	15							
620			DP-5	43	N/A		▽	
	20						Dense, wet, gray, silty SAND, with some clay [LACUSTRINE]	
615			DP-6	40	N/A		Medium stiff, moist, gray, CLAY, with sand and silt varving [LACUSTRINE]	
							Dense, wet, gray, SAND [LACUSTRINE]	
	25		DP-7	34	N/A		Stiff, moist, gray, CLAY [TILL]	
610							End of Boring at 27' bgs	

Report: GEOPROBE_SOIL_BORING; File: C:\USERS\ANTON_HEITGER\DESKTOP\DETREX MAY 2012 GPS.GPJ; 5/21/2012

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Project: Detrex MIP Confirmatory Borings
Project Location: 1100 State Road, Ashtabula, OH
Project Number: 13814865

Log of Boring GP-7

Sheet 1 of 1

Date(s) Drilled	5/1/12	Logged By	W. Clayton	Checked By	M. Schmidt
Drilling Method	Direct Push	Drill Bit Size/Type	Dual Tube Geoprobe Sampler	Total Depth of Borehole	20.0 feet
Drill Rig Type	Geoprobe 6620 DT	Drilling Contractor	Frontz Drilling	Surface Elevation	638.3
Groundwater Level at Time of Drilling	Approximately 10.3' bgs ATD	Sampler Types	4' Dual Tube Sampler	Boring Completion	Bentonite Chips
Boring Location					

Elevation, feet	Depth, feet	SAMPLES Type	Number	Recovery, inches	Headspace, ppm	Graphic Log	MATERIAL DESCRIPTION	FIELD NOTES
	0						Stiff to very stiff, moist, gray and tan, CLAY (reworked) [FILL]	
635			DP-1	29	N/A			
	5		DP-2	36	N/A			
630								
	10		DP-3	40	N/A		Dense, wet, gray, SAND with DNAPL ganglia becomes brown	▽
625			DP-4	43	N/A		Stiff to very stiff, moist, gray and tan mottled, CLAY (reworked) [FILL]	
	15						Stiff, moist, gray, CLAY, with silt laminations [LACUSTRINE]	
620			DP-5	48	N/A			
	20						End of Boring at 20' bgs	

Report: GEOPROBE_SOIL_BORING; File: C:\USERS\ANTON_HEITGER\DESKTOP\DETREX MAY 2012 GPS.GPJ; 5/21/2012

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Project: Detrex MIP Confirmatory Borings Project Location: 1100 State Road, Ashtabula, OH Project Number: 13814865	Log of Boring GP-10 Sheet 1 of 2

Date(s) Drilled	5/1/12	Logged By	W. Clayton	Checked By	M. Schmidt
Drilling Method	Direct Push	Drill Bit Size/Type	Dual Tube Geoprobe Sampler	Total Depth of Borehole	24.0 feet
Drill Rig Type	Geoprobe 6620 DT	Drilling Contractor	Frontz Drilling	Surface Elevation	637.0
Groundwater Level at Time of Drilling	None Encountered ATD	Sampler Types	4' Dual Tube Sampler	Boring Completion	Bentonite Chips
Boring Location					

Elevation, feet	Depth, feet	SAMPLES Type	Number	Recovery, inches	Headspace, ppm	Graphic Log	MATERIAL DESCRIPTION	FIELD NOTES
	0						Stiff to very stiff, moist, brown and gray, CLAY, with sand [FILL]	
636	1							
	2		DP-1	24	N/A			
634	3							
	4						Sheen	
632	5							
	6		DP-2	20	N/A			
630	7							
	8							
628	9							
	10		DP-3	44	N/A			
626	11							
	12							

Report: GEOPROBE_SOIL_BORING; File: C:\USERS\ANTON_HEITGER\DESKTOP\DETREX MAY 2012 GPS.GPJ; 5/21/2012

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Project: Detrex MIP Confirmatory Borings
Project Location: 1100 State Road, Ashtabula, OH
Project Number: 13814865

Log of Boring GP-10

Sheet 2 of 2

Elevation, feet	Depth, feet	SAMPLES: Type	Number	Recovery, inches	Headspace, ppm	Graphic Log	MATERIAL DESCRIPTION	Well Details	FIELD NOTES
	12								
624	13								
	14		DP-4	39	N/A		Sheen Stiff, moist, gray, CLAY, with laminations [LACUSTRINE]		
622	15								
	16						with some fine to medium sand		
620	17								
	18		DP-5	40	N/A				
618	19								
	20						with DNAPL ganglia		
616	21								
	22		DP-6	42	N/A				
614	23								
	24						Stiff to very stiff, moist, gray, CLAY, with medium to coarse sand [TILL] End of Boring at 24´ bgs		
612	25								
	26								

Report: GEOPROBE_SOIL_BORING; File: C:\USERS\ANTON_HEITGER\DESKTOP\DETREX MAY 2012 GPS.GPJ; 5/21/2012

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Project: Detrex MIP Confirmatory Borings
Project Location: 1100 State Road, Ashtabula, OH
Project Number: 13814865

Log of Boring GP-11

Sheet 1 of 1

Date(s) Drilled	5/1/12	Logged By	W. Clayton	Checked By	M. Schmidt
Drilling Method	Direct Push	Drill Bit Size/Type	Dual Tube Geoprobe Sampler	Total Depth of Borehole	24.0 feet
Drill Rig Type	Geoprobe 6620 DT	Drilling Contractor	Frontz Drilling	Surface Elevation	635.9
Groundwater Level at Time of Drilling	Approximately 13.0' bgs ATD	Sampler Types	4' Dual Tube Sampler	Boring Completion	Bentonite Chips
Boring Location					

Elevation, feet	Depth, feet	SAMPLES Type	Number	Recovery, inches	Headspace, ppm	Graphic Log	MATERIAL DESCRIPTION	FIELD NOTES
635	0		DP-1	32	N/A		Stiff, moist, gray and tan, CLAY (reworked) [FILL]	
	5		DP-2	20	N/A		← becomes medium stiff Loose, moist, brown, SAND [FILL]	
630	10		DP-3	28	N/A		Stiff, moist, gray, silty CLAY	
625			DP-4	46	N/A		▽ Dense, wet, gray, SAND Medium stiff to stiff, moist, gray, CLAY, with silt laminations and varvings [LACUSTRINE]	
	15		DP-5	46	N/A			
620	20		DP-6	48	N/A		Stiff to very stiff, moist, gray, CLAY, with medium to coarse sand and fine Gravel [TILL] ← with streaks of reddish purple Clay	
615	25						End of Boring at 24´ bgs	

Report: GEOPROBE_SOIL_BORING; File: C:\USERS\ANTON_HEITGER\DESKTOP\DETREX MAY 2012 GPS.GPJ; 5/21/2012

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Project: Detrex MIP Confirmatory Borings
Project Location: 1100 State Road, Ashtabula, OH
Project Number: 13814865

Log of Boring GP-16

Sheet 1 of 2

Date(s) Drilled	5/1/12	Logged By	W. Clayton	Checked By	M. Schmidt
Drilling Method	Direct Push	Drill Bit Size/Type	Dual Tube Geoprobe Sampler	Total Depth of Borehole	27.0 feet
Drill Rig Type	Geoprobe 6620 DT	Drilling Contractor	Frontz Drilling	Surface Elevation	638.7
Groundwater Level at Time of Drilling	Approximately 20.0' bgs ATD	Sampler Types	4' Dual Tube Sampler	Boring Completion	Bentonite Chips
Boring Location					

Elevation, feet	Depth, feet	SAMPLES Type	Number	Recovery, inches	Headspace, ppm	Graphic Log	MATERIAL DESCRIPTION	FIELD NOTES
635	0		DP-1	22	N/A		Medium stiff, moist, tan and gray, CLAY, with gravel [FILL]	
	5		DP-2	30	N/A		Loose, moist to wet, light gray, SAND, with strong solvent odor [FILL]	
630			DP-3	36	N/A		Stiff, moist, brown, tan and gray, CLAY (reworked) [FILL]	
	10						becomes medium stiff to stiff, with silt and sand	
625			DP-4	42	N/A		Medium stiff to stiff, moist, gray, CLAY [FILL]	
	15							

Report: GEOPROBE_SOIL_BORING; File: C:\USERS\ANTON_HEITGER\DESKTOP\DETREX MAY 2012 GPS.GPJ; 5/21/2012

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Project: Detrex MIP Confirmatory Borings
Project Location: 1100 State Road, Ashtabula, OH
Project Number: 13814865

Log of Boring GP-16

Sheet 2 of 2

Elevation, feet	Depth, feet	SAMPLES Type	Number	Recovery, inches	Headspace, ppm	Graphic Log	MATERIAL DESCRIPTION	Well Details	FIELD NOTES
							Dense, moist, gray and brown, SAND (reworked) [FILL]		
							Stiff, moist, gray, CLAY, with varving [LACUSTRINE]		
			DP-5	47	N/A		SAND layer with sheen		
620	20						becomes wet ▽		
			DP-6	46	N/A		with DNAPL ganglia (20-22')		
615									
	25		DP-7	36	N/A				
							Stiff to very stiff, moist, gray, CLAY, with gravel and shale fragments [TILL]		
							End of Boring at 27′ bgs		
610	30								
605									

Report: GEOPROBE_SOIL_BORING; File: C:\USERS\ANTON_HEITGER\DESKTOP\DETREX MAY 2012 GP'S.GPJ; 5/21/2012

URS

Project: Detrex MIP Confirmatory Borings
Project Location: 1100 State Road, Ashtabula, OH
Project Number: 13814865

Log of Boring GP-20

Sheet 1 of 1

Date(s) Drilled	5/2/12	Logged By	W. Clayton	Checked By	M. Schmidt
Drilling Method	Direct Push	Drill Bit Size/Type	Dual Tube Geoprobe Sampler	Total Depth of Borehole	24.0 feet
Drill Rig Type	Geoprobe 6620 DT	Drilling Contractor	Frontz Drilling	Surface Elevation	637.3
Groundwater Level at Time of Drilling	None Encountered ATD	Sampler Types	4' Dual Tube Sampler	Boring Completion	Bentonite Chips
Boring Location					

Elevation, feet	Depth, feet	SAMPLES Type	Number	Recovery, inches	Headspace, ppm	Graphic Log	MATERIAL DESCRIPTION	FIELD NOTES
	0						Medium stiff, moist, brown, CLAY [FILL]	
635			DP-1	24	N/A		Dense, moist, light gray, SAND [FILL]	
	5		DP-2	24	N/A			
630								
			DP-3	48	N/A		Stiff, moist, brown, CLAY [FILL]	
	10						becomes gray	
625			DP-4	48	N/A			
	15						Stiff, moist, gray, CLAY, with sand and silt laminations [LACUSTRINE]	
620			DP-5	47	N/A			
	20							
615			DP-6	46	N/A		Stiff to very stiff, moist, gray, CLAY, with medium to coarse sand and fine gravel [TILL]	
							End of Boring at 24' bgs	
	25							

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URS

Project: Detrex MIP Confirmatory Borings
Project Location: 1100 State Road, Ashtabula, OH
Project Number: 13814865

Log of Boring GP-25

Sheet 1 of 2

Date(s) Drilled	5/1/12	Logged By	W. Clayton	Checked By	M. Schmidt
Drilling Method	Direct Push	Drill Bit Size/Type	Dual Tube Geoprobe Sampler	Total Depth of Borehole	27.0 feet
Drill Rig Type	Geoprobe 6620 DT	Drilling Contractor	Frontz Drilling	Surface Elevation	636.0
Groundwater Level at Time of Drilling	None Encountered ATD	Sampler Types	4' Dual Tube Sampler	Boring Completion	Bentonite Chips
Boring Location					

Elevation, feet	Depth, feet	SAMPLES Type	Number	Recovery, inches	Headspace, ppm	Graphic Log	MATERIAL DESCRIPTION	FIELD NOTES
635	0		DP-1	22	N/A		Stiff, moist, gray and brown, CLAY, with gravel [FILL]	
							becomes reworked, with sand and silt	
	5		DP-2	35	N/A		with gray sand and silt throughout, some gravel	
630							sand content decreases	
	10		DP-3	46	N/A		gray and brown coloration mixed vertically	
625								
			DP-4	46	N/A		Stiff to medium stiff, moist, gray, CLAY, with sand and silt seams throughout [LACUSTRINE]	
	15						SAND seam with sheen	

Report: GEOPROBE_SOIL_BORING; File: C:\USERS\ANTON_HEITGER\DESKTOP\DETREX MAY 2012 GPS.GPJ; 5/21/2012

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Project: Detrex MIP Confirmatory Borings
Project Location: 1100 State Road, Ashtabula, OH
Project Number: 13814865

Log of Boring GP-25

Sheet 2 of 2

Elevation, feet	Depth, feet	SAMPLES: Type	Number	Recovery, inches	Headspace, ppm	Graphic Log	MATERIAL DESCRIPTION	Well Details	FIELD NOTES
620			DP-5	47	N/A		Stiff to medium stiff, moist, gray, CLAY, with sand and silt seams throughout [LACUSTRINE]		
	20						Stiff to very stiff, moist, gray, CLAY, with gravel and shale fragments [TILL]		
615			DP-6	45	N/A				
	25		DP-7	36	N/A				
610							End of Boring at 27' bgs		
	30								
605									

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URS

Project: Detrex MIP Confirmatory Borings
Project Location: 1100 State Road, Ashtabula, OH
Project Number: 13814865

Log of Boring GP-48

Sheet 1 of 2

Date(s) Drilled	5/2/12	Logged By	W. Clayton	Checked By	M. Schmidt
Drilling Method	Direct Push	Drill Bit Size/Type	Dual Tube Geoprobe Sampler	Total Depth of Borehole	27.0 feet
Drill Rig Type	Geoprobe 6620 DT	Drilling Contractor	Frontz Drilling	Surface Elevation	635.7
Groundwater Level at Time of Drilling	Approximately 17.0' bgs ATD	Sampler Types	4' Dual Tube Sampler	Boring Completion	Bentonite Chips
Boring Location					

Elevation, feet	Depth, feet	SAMPLES Type	Number	Recovery, inches	Headspace, ppm	Graphic Log	MATERIAL DESCRIPTION	FIELD NOTES
635	0		DP-1	46	N/A		Stiff, moist, brown, gray and tan CLAY [FILL]	
	5		DP-2	40	N/A		black and white granular material [FILL] becomes brown	
630								
	10		DP-3	38	N/A		becomes gray becomes brown, with sand and silt	
625								
			DP-4	48	N/A			
	15						Stiff, moist, gray, CLAY, with some sand	
620								

Report: GEOPROBE_SOIL_BORING; File: C:\USERS\ANTON_HEITGER\DESKTOP\DETREX MAY 2012 GPS.GPJ; 5/21/2012

URS

Project: Detrex MIP Confirmatory Borings
Project Location: 1100 State Road, Ashtabula, OH
Project Number: 13814865

Log of Boring GP-48

Sheet 2 of 2

Elevation, feet	Depth, feet	SAMPLES Type	Number	Recovery, inches	Headspace, ppm	Graphic Log	MATERIAL DESCRIPTION	Well Details	FIELD NOTES
			DP-5	46	N/A		Stiff, moist, gray, CLAY, with some sand ▽		
							Loose, wet, gray, SAND, with sheen		
							Stiff, moist, gray, CLAY, with sand and silt throughout		
							Loose, wet, gray, SAND		
615	20		DP-6	42	N/A		Stiff, moist, gray, CLAY, with sand and silt throughout		
							Loose, wet, gray, SAND, with DNAPL ganglia		
610	25		DP-7	34	N/A		← sheen		
							Stiff, moist, gray, CLAY		
							End of Boring at 27´ bgs		
605	30								

Report: GEOPROBE_SOIL_BORING; File: C:\USERS\ANTON_HEITGER\DESKTOP\DETREX MAY 2012 GP'S.GPJ; 5/21/2012

URS

Project: Detrex MIP Confirmatory Borings
Project Location: 1100 State Road, Ashtabula, OH
Project Number: 13814865

Log of Boring GP-49

Sheet 1 of 1

Date(s) Drilled	5/1/12	Logged By	W. Clayton	Checked By	M. Schmidt
Drilling Method	Direct Push	Drill Bit Size/Type	Dual Tube Geoprobe Sampler	Total Depth of Borehole	24.0 feet
Drill Rig Type	Geoprobe 6620 DT	Drilling Contractor	Frontz Drilling	Surface Elevation	635.4
Groundwater Level at Time of Drilling	Approximately 16.0' bgs ATD	Sampler Types	4' Dual Tube Sampler	Boring Completion	Bentonite Chips
Boring Location					

Elevation, feet	Depth, feet	SAMPLES Type	Number	Recovery, inches	Headspace, ppm	Graphic Log	MATERIAL DESCRIPTION	FIELD NOTES
635	0		DP-1	32	N/A		Stiff, moist, brown, CLAY [FILL] becomes gray and tan (reworked)	
630	5		DP-2	30	N/A		Dense, moist to wet, brown, SILT lens, with sheen becomes brown	
625	10		DP-3	38	N/A		becomes gray becomes brown SAND layer, with DNAPL ganglia	
620	15		DP-4	46	N/A		Stiff, moist, gray, CLAY, some silt, with varving and laminations [LACUSTRINE]	
			DP-5	42	N/A		Dense, wet, gray, SILT, with sheen [LACUSTRINE] Stiff, moist, gray, CLAY, with silt laminations [LACUSTRINE]	
615	20		DP-6	47	N/A		Stiff to very stiff, moist, gray, CLAY, with gravel and sand [TILL]	
	25						End of Boring at 24' bgs	

Report: GEOPROBE_SOIL_BORING; File: C:\USERS\ANTON_HEITGER\DESKTOP\DETREX MAY 2012 GPS.GPJ; 5/21/2012

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BORING LOGS
(OUTSIDE LAGOON AREA)

Project: Detrex MIP Confirmatory Borings
Project Location: 1100 State Road, Ashtabula, OH
Project Number: 13814865

Key to Log of Boring

Sheet 1 of 1

Elevation, feet	Depth, feet	SAMPLES: Type	SAMPLES: Number	Recovery, inches	Headspace, ppm	Graphic Log	MATERIAL DESCRIPTION	FIELD NOTES
1	2	3	4	5	6	7	8	9

COLUMN DESCRIPTIONS

1. **Elevation:** Elevation in feet referenced to mean sea level.
2. **Depth:** Depth in feet below the ground surface.
3. **Sample Type:** Type of soil sample collected at depth interval shown; sampler symbols are explained below.
4. **Sample Number:** Sample identification number.
5. **Recovery:** Length (in inches) of soil sample actually recovered in the sampler.
6. **Headspace, ppm** MiniRae 11.7eV Photo-Ionization Detector (PID) reading in headspace of sealable plastic bag after several minutes of vapor accumulation.
7. **Graphic Log:** Graphic depiction of subsurface material encountered; typical symbols are explained below.
8. **Material Description:** Description of material encountered; may include moisture, color, grain size, and density/consistency.
9. **Remarks:** Comments and observations regarding drilling or sampling made by driller or field personnel.

ATD At Time of Drilling
NR Not Recorded
NA Not Applicable
bgs Below Ground Surface

TYPICAL MATERIAL GRAPHIC SYMBOLS


FILL


SAND


Silty SAND


SILT


Clayey SILT


Silty CLAY


CLAY

TYPICAL SAMPLER GRAPHIC SYMBOLS


Geoprobe Dual Tube Sampler

OTHER GRAPHIC SYMBOLS


First water encountered at time of drilling and sampling (ATD)


Static water level measured using electronic water level indicator


Minor change in material properties within a lithologic stratum

GENERAL NOTES

1. Soil classifications are based on the Unified Soil Classification System. Descriptions and stratum lines are interpretive; actual lithologic changes may be gradual. Field descriptions may have been modified to reflect results of lab tests.
2. Descriptions on these logs apply only at the specific boring locations and at the time the borings were advanced. They are not warranted to be representative of subsurface conditions at other locations or times.

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Report: GEOPROBE_SOIL_BORING_KEY; File: C:\USERS\ANTON_HEITGER\DESKTOP\DETREX MAY 2012 GPS.GPJ; 5/21/2012

Project: Detrex MIP Confirmatory Borings
Project Location: 1100 State Road, Ashtabula, OH
Project Number: 13814865

Log of Boring GP-21

Sheet 1 of 1

Date(s) Drilled	5/2/12	Logged By	W. Clayton	Checked By	M. Schmidt
Drilling Method	Direct Push	Drill Bit Size/Type	Dual Tube Geoprobe Sampler	Total Depth of Borehole	24.0 feet
Drill Rig Type	Geoprobe 6620 DT	Drilling Contractor	Frontz Drilling	Surface Elevation	635.4
Groundwater Level at Time of Drilling	Approximately 12.0' bgs ATD	Sampler Types	4' Dual Tube Sampler	Boring Completion	Bentonite Chips
Boring Location					

Elevation, feet	Depth, feet	SAMPLES Type	Number	Recovery, inches	Headspace, ppm	Graphic Log	MATERIAL DESCRIPTION	FIELD NOTES
635	0		DP-1	36	N/A		TOPSOIL Stiff, moist, tan and gray, CLAY (reworked) [FILL]	
630	5		DP-2	38	N/A		Stiff, moist, brown, sandy CLAY	
625	10		DP-3	46	N/A		Stiff, moist, gray, CLAY, with silt [LACUSTRINE] becomes medium stiff, wet, with silt and sand varving ▽	
620	15		DP-4	48	N/A			
			DP-5	46	N/A		Silt and sand content decreases	
615	20		DP-6	47	N/A		Stiff to very stiff, moist, gray, CLAY, with fine to medium sand and fine gravel [TILL]	
	25						End of Boring at 24' bgs	

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Report: GEOPROBE_SOIL_BORING; File: C:\USERS\ANTON_HEITGER\DESKTOP\DETREX MAY 2012 GPS.GPJ; 5/21/2012

Project: Detrex MIP Confirmatory Borings
Project Location: 1100 State Road, Ashtabula, OH
Project Number: 13814865

Log of Boring GP-28

Sheet 1 of 2

Date(s) Drilled	5/2/12	Logged By	W. Clayton	Checked By	M. Schmidt
Drilling Method	Direct Push	Drill Bit Size/Type	Dual Tube Geoprobe Sampler	Total Depth of Borehole	28.0 feet
Drill Rig Type	Geoprobe 6620 DT	Drilling Contractor	Frontz Drilling	Surface Elevation	635.5
Groundwater Level at Time of Drilling	Approximately 13.5' bgs ATD	Sampler Types	4' Dual Tube Sampler	Boring Completion	Bentonite Chips
Boring Location					

Elevation, feet	Depth, feet	SAMPLES Type	Number	Recovery, inches	Headspace, ppm	Graphic Log	MATERIAL DESCRIPTION	FIELD NOTES
635	0		DP-1	32	N/A		Stiff, moist, tan and gray mottled, CLAY	
							becomes brown, with sand and silt throughout	
630	5		DP-2	40	N/A			
			DP-3	44	N/A		Stiff, moist, gray, CLAY, with laminations and varving [LACUSTRINE]	
625	10						Sand and Silt layer, with sheen	
			DP-4	46	N/A		Dense, wet, gray, SAND [LACUSTRINE]	
	15						Stiff, moist to wet, gray, CLAY, with silt and sand laminations and varving [LACUSTRINE]	
620							sand content increases	
							becomes medium stiff to stiff	
			DP-5	48	N/A		sand content decreases	
	20							

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Project: Detrex MIP Confirmatory Borings
Project Location: 1100 State Road, Ashtabula, OH
Project Number: 13814865

Log of Boring GP-28

Sheet 2 of 2

Elevation, feet	Depth, feet	SAMPLES: Type	Number	Recovery, inches	Headspace, ppm	Graphic Log	MATERIAL DESCRIPTION	Well Details	FIELD NOTES
615	20		DP-6	47	N/A		Stiff, moist to wet, gray, CLAY, with sand and silt laminations and varving [LACUSTRINE] sand becomes medium to coarse grained		
610	25		DP-7	46	N/A		Stiff, moist, gray, CLAY, with coarse sand and fine gravel [TILL]		
							End of Boring at 28' bgs		
605	30								
600	35								
595	40								

Report: GEOPROBE_SOIL_BORING; File: C:\USERS\ANTON_HEITGER\DESKTOP\DETREX MAY 2012 GP'S.GPJ; 5/21/2012

URS

Project: Detrex MIP Confirmatory Borings
Project Location: 1100 State Road, Ashtabula, OH
Project Number: 13814865

Log of Boring GP-36

Sheet 1 of 1

Date(s) Drilled	5/1/12	Logged By	W. Clayton	Checked By	M. Schmidt
Drilling Method	Direct Push	Drill Bit Size/Type	Dual Tube Geoprobe Sampler	Total Depth of Borehole	24.0 feet
Drill Rig Type	Geoprobe 6620 DT	Drilling Contractor	Frontz Drilling	Surface Elevation	635.9
Groundwater Level at Time of Drilling	Approximately 10.5' bgs ATD	Sampler Types	4' Dual Tube Sampler	Boring Completion	Bentonite Chips
Boring Location					

Elevation, feet	Depth, feet	SAMPLES Type	Number	Recovery, inches	Headspace, ppm	Graphic Log	MATERIAL DESCRIPTION	FIELD NOTES
635	0		DP-1	46	N/A		Dense, moist, gray and black, SAND and GRAVEL [FILL]	
							Stiff, moist, gray and tan mottled, CLAY	
							with varving	
630	5		DP-2	42	N/A			
			DP-3	44	N/A		Stiff, moist, gray, CLAY, with some silt [LACUSTRINE]	
625	10						becomes wet ▽	
							sheen	
			DP-4	48	N/A		Dense, wet, gray, SILT [LACUSTRINE]	
620	15							
			DP-6	48	N/A		Stiff, moist, gray, CLAY, with gravel and sand [TILL]	
615	20		DP-7	39	N/A			
	25						End of Boring at 24´ bgs	

Report: GEOPROBE_SOIL_BORING; File: C:\USERS\ANTON_HEITGER\DESKTOP\DETREX MAY 2012 GPS.GPJ; 5/21/2012

URS

Project: Detrex MIP Confirmatory Borings
Project Location: 1100 State Road, Ashtabula, OH
Project Number: 13814865

Log of Boring GPMW-10

Sheet 1 of 1

Date(s) Drilled	5/2/12	Logged By	W. Clayton	Checked By	M. Schmidt
Drilling Method	Direct Push	Drill Bit Size/Type	Dual Tube Geoprobe Sampler	Total Depth of Borehole	24.0 feet
Drill Rig Type	Geoprobe 6620 DT	Drilling Contractor	Frontz Drilling	Surface Elevation	636.3
Groundwater Level at Time of Drilling	Approximately 10.5' bgs ATD	Sampler Types	4' Dual Tube Sampler	Boring Completion	Bentonite Chips
Boring Location					

Elevation, feet	Depth, feet	SAMPLES Type	Number	Recovery, inches	Headspace, ppm	Graphic Log	MATERIAL DESCRIPTION	FIELD NOTES
635	0		DP-1	38	N/A		Stiff, moist, gray, tan and brown mottled, CLAY	
630	5		DP-2	32	N/A		becomes brown, with some sand lenses	
625	10		DP-3	27	N/A		becomes wet	
			DP-4	48	N/A		Stiff, moist, gray, CLAY, with sand and silt laminations [LACUSTRINE] Loose, wet, gray, SAND seam	
620	15		DP-5	48	N/A		Stiff to very stiff, moist, gray, CLAY, with fine to medium gravel and medium to coarse sand [TILL]	
615	20		DP-6	47	N/A			
	25						End of Boring at 24' bgs	

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